AMENDMENTS TO THE CLAIMS

1-19. (Canceled)

20. (Currently Amended) A method for increasing the production capacity of wells that contain oil, gas and/or water by stimulating mass transference processes within said well, said method comprising:

immersing an electro acoustic device in a well bore region of a well, said electro acoustic device comprising a sonotrode and an electro acoustic transducer, said sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of said well, wherein dimensions of said tubular geometric shape are determined by operating conditions under resonance parameters of longitudinal and radial vibrations in a natural resonance frequency of said electro acoustic transducer; ~~and~~

using said electro acoustic device to introduce mechanical vibrations in said well bore region along the axis of said well, producing shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves; and

providing a plurality of grooves in a generatrix of said sonotrode, wherein said grooves are placed parallel to a longitudinal axis of said sonotrode, and said grooves have a groove length that is a multiple of half the wavelength generated and a groove width in the range of approximately 0.3 to 1.5 times a diameter of said sonotrode.

21. (Previously Presented) The method of claim 20, wherein the superposition of said longitudinal and shear waves provide an acoustic flow with speed U_f and wavelength $\lambda/4$.

22. (Previously Presented) The method of claim 20 further comprising:

forming a vibratory system comprising two or more electro acoustic transducers operating in phase, connected to said sonotrode at distances that are multiples of half the wavelength of longitudinal and radial waves generated.

23. (Previously Presented) The method of claim 22, further comprising:

providing an even number of vibratory systems in said electro acoustic device, wherein the electro acoustic transducers of each vibratory system operate in phase, and adjacent vibratory systems operate in antiphase with respect to each other.

24. (Canceled)

25. (Previously Presented) The method of claim 20, further comprising:

configuring a first end of said sonotrode in the shape of a horn and a second end in the shape of a hemisphere with an inner diameter that is one-half the diameter of said tubular geometric shape.

26. (Previously Presented) The method of claim 20, wherein said electro acoustic transducer is of a magnetostrictive type.

27. (Previously Presented) The method of claim 20, wherein said electro acoustic transducer is of a piezoelectric type.

28. (Currently Amended) An electro acoustic device for increasing the production capacity of wells that contain oil, gas and/or water by stimulating mass transference processes within said wells, said electro acoustic device comprising:

an electro acoustic transducer; and

a sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of a well, wherein dimensions of said tubular geometric shape are determined by operating conditions under resonance parameters of longitudinal and radial vibrations in a natural resonance frequency of said electro acoustic transducer, said sonotrode comprising a first end having the shape of a horn and a second end having the shape of a hemisphere with an inner diameter one-half the diameter of said tubular geometric shape;

wherein said electro acoustic device is configured to introduce mechanical vibrations in a well bore region along said axis of said well, producing shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves.

29. (Previously Presented) The electro acoustic device of claim 28, wherein said superposition of longitudinal and shear waves provide an acoustic flow with speed U_f and wavelength $\lambda/4$.

30. (Canceled)

31. (Previously Presented) The electro acoustic device of claim 28, wherein said electro acoustic transducer is of a magnetostrictive type.

32. (Previously Presented) The electro acoustic device of claim 28, wherein said electro acoustic transducer is of a piezoelectric type.

33. (Previously Presented) The electro acoustic device of claim 28, comprising:

a vibratory system comprising a plurality of electro acoustic transducers operating in phase, wherein said plurality of electro acoustic transducers are connected to said sonotrode at distances that are multiples of half the wavelength of longitudinal and radial waves generated.

34. (Previously Presented) The electro acoustic device of claim 33, comprising an even number of said vibratory systems, wherein the electro acoustic transducers of adjacent vibratory systems are configured to operate in antiphase with respect to each other.

35. (Previously Presented) The electro acoustic device of claim 28, wherein said sonotrode comprises a plurality of grooves in its generatrix.

36. (Previously Presented) The electro acoustic device of claim 35, wherein said grooves are placed parallel to a longitudinal axis of said sonotrode, and have a groove length that is a multiple of half the wavelength generated and a groove width in the range of approximately 0.3 to 1.5 times a diameter of said sonotrode.

37. (Previously Presented) An electro acoustic device for increasing the production capacity of wells that contain oil, gas and/or water by stimulating mass transference processes within said wells, said electro acoustic device comprising:

an electro acoustic transducer; and

a sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of a well, wherein said sonotrode comprises a first end adjacent to said electro acoustic transducer, said first end having the shape of a horn, and a second end having the shape of a hemisphere with an inner diameter one-half the diameter of said tubular geometric shape;

wherein said electro acoustic device is configured to introduce mechanical vibrations in a well bore region along said axis of said well, producing shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves.

38. (New) A method for increasing the production capacity of wells that contain oil, gas and/or water by stimulating mass transference processes within said well, said method comprising:

immersing an electro acoustic device in a well bore region of a well, said electro acoustic device comprising a sonotrode and an electro acoustic transducer, said sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of said well, wherein dimensions of said tubular geometric shape are determined by operating conditions under resonance parameters of longitudinal and radial vibrations in a natural resonance frequency of said electro acoustic transducer;

using said electro acoustic device to introduce mechanical vibrations in said well bore region along the axis of said well, producing shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves; and

configuring a first end of said sonotrode in the shape of a horn and a second end in the shape of a hemisphere with an inner diameter that is one-half the diameter of said tubular geometric shape.

39. (New) The method of claim 38, wherein the superposition of said longitudinal and shear waves provide an acoustic flow with speed U_f and wavelength $\lambda/4$.

40. (New) The method of claim 38 further comprising:

forming a vibratory system comprising two or more electro acoustic transducers operating in phase, connected to said sonotrode at distances that are multiples of half the wavelength of longitudinal and radial waves generated.

41. (New) The method of claim 40, further comprising:

providing an even number of vibratory systems in said electro acoustic device, wherein the electro acoustic transducers of each vibratory system operate in phase, and adjacent vibratory systems operate in antiphase with respect to each other.

42. (New) The method of claim 38, wherein said electro acoustic transducer is of a magnetostrictive type.

43. (New) The method of claim 38, wherein said electro acoustic transducer is of a piezoelectric type.

44. (New) An electro acoustic device for increasing the production capacity of wells that contain oil, gas and/or water by stimulating mass transference processes within said wells, said electro acoustic device comprising:

an electro acoustic transducer; and

a sonotrode having a tubular geometric shape with an irradiation surface developed along an axis of a well, wherein dimensions of said tubular geometric shape are determined by operating conditions under resonance parameters of longitudinal and radial vibrations in a natural resonance frequency of said electro acoustic transducer;

wherein said electro acoustic device is configured to introduce mechanical vibrations in a well bore region along said axis of said well, producing shear vibrations in the well bore region due to displacement of phase of said mechanical vibrations, achieving alternately tension and pressure by superposition of longitudinal and shear waves;

said sonotrode comprising a plurality of grooves in its generatrix, wherein said grooves are placed parallel to a longitudinal axis of said sonotrode, and have a groove length that is a multiple of half the wavelength generated and a groove width in the range of approximately 0.3 to 1.5 times a diameter of said sonotrode.

45. (New) The electro acoustic device of claim 44, wherein said superposition of longitudinal and shear waves provide an acoustic flow with speed U_f and wavelength $\lambda/4$.

46. (New) The electro acoustic device of claim 44, wherein said electro acoustic transducer is of a magnetostrictive type.

47. (New) The electro acoustic device of claim 44, wherein said electro acoustic transducer is of a piezoelectric type.

48. (New) The electro acoustic device of claim 44, comprising:

a vibratory system comprising a plurality of electro acoustic transducers operating in phase, wherein said plurality of electro acoustic transducers are connected to said sonotrode at distances that are multiples of half the wavelength of longitudinal and radial waves generated.

49. (New) The electro acoustic device of claim 48, comprising an even number of said vibratory systems, wherein the electro acoustic transducers of adjacent vibratory systems are configured to operate in antiphase with respect to each other.